

**Notice of Allowability**

Application No.

09/576,623

Applicant(s)

CARMAN, JOHN G.

Examiner

Anne R. Kubelik

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 25 July 2003.
2. ☒ The allowed claim(s) is/are 1-3, 8, 12, 17-18, 34-38 and 40-44, renumbered as claims 1-5, 12-17 and 6-11, respectively.
3. ☒ The drawings filed on 23 May 2000 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.
5. ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
  - (a) ☐ The translation of the foreign language provisional application has been received.
6. ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☐ CORRECTED DRAWINGS must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No. \_\_\_\_\_.
  - (b) ☐ including changes required by the proposed drawing correction filed \_\_\_\_\_, which has been approved by the Examiner.
  - (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1 <input type="checkbox"/> Notice of References Cited (PTO-892)  | 2 <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)         |
| 3 <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                    | 4 <input checked="" type="checkbox"/> Interview Summary (PTO-413), Paper No. _____ |
| 5 <input type="checkbox"/> Information Disclosure Statements (PTO-1449), Paper No. _____               | 6 <input checked="" type="checkbox"/> Examiner's Amendment/Comment                 |
| 7 <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | 8 <input type="checkbox"/> Examiner's Statement of Reasons for Allowance           |
|  | 9 <input type="checkbox"/> Other _____   |

***Examiner's Amendment***

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Alan Howarth on 16 October 2003.

Claim 9 was cancelled without prejudice.

Claim 1 (amended) A method for obtaining apomictic plants from sexual plants, wherein the method comprises [comprising]:

(a) obtaining two [sets of] diploid delineated sexual [lines] plants from an angiospermous plant species, genus, or family,

wherein [such two sets of] the diploid delineated sexual [lines] plants express differences in their flowering responses to various photoperiods and differ such that initiation of embryo sac formation in one [set of] diploid delineated sexual [lines] plant occurs at about the same time as or before meiosis in the other [set of] diploid delineated sexual [lines] plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues; [and]

(b) hybridizing said two [sets of] diploid delineated sexual [lines] plants,

(c) recovering seed therefrom,

(d) sowing said seed, and

(e) selecting diploid hybrid [lines] plants that are apomictic [express apomixis].

In claims 2-3, 8, 12, 38, and 40-44, line 1, a comma was inserted after “1”.

In claims 2-3, 12 and 40-44, line 2, “two sets of” was deleted and “lines” was replaced with --plants--.

Claim 17 (amended): A method for obtaining apomictic plants from sexual plants, wherein the method comprises [comprising]:

(a) screening plants within[identifying differences in flowering responses to various photoperiods within] an angiospermous plant species, genus, or family[;] for differences in flowering responses to various photoperiods and for differences among the plants in their times of initiation of embryo sac formation and times of meiosis relative to the developmental maturity of the nongametophytic ovule and ovary tissues;

(b) selecting two [obtaining two sets of diploid lines of said plant species, genus, or family wherein said sets of lines differ in their flowering responses to various photoperiods;

(c) identifying differences within and between said sets of lines] plants that differ in their flowering responses to various photoperiods and that differ such that initiation of embryo sac formation in one [set of lines] plant occurs at about the same time as or before meiosis in the other [set of lines] plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues;

[(d) obtaining two sets of diploid delineated sexual lines of said species, genus, or family that differ in their flowering responses to various photoperiods and such that initiation of embryo

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sac formation in one set of delineated sexual lines occurs at about the same time as or before meiosis in the lines relative to developmental maturity of nongametophytic ovule and ovary tissues; and

(e)] (c) producing diploid hybrid [lines] plants that express apomixis by hybridizing said two [sets of diploid delineated sexual lines] plants,

(d) recovering hybrid seed therefrom,

(e) sowing said hybrid seed, and

(f) selecting [said] diploid hybrid [lines] plants that are apomictic [express apomixis].

Claim 18 (amended): A method for obtaining polyembryonic plants from sexual aposporic, diplosporic, monocotyledonous or dicotyledonous plants, wherein the method comprises [comprising]:

(a) screening plants within[identifying differences in flowering responses to various photoperiods within] an angiospermous plant species, genus, or family[;] for differences in days to flowering or photoperiod required to induce flowering,

(b) [obtaining two sets of diploid lines of said plant species, genus, or family such that said two sets of diploid lines differ in their days to flowering or photoperiod required to induce flowering;

(c) identifying within and between said two sets of diploid lines] and for differences in their start times and durations of female or seed developmental stages, wherein the stages are selected from the group consisting of archesporium formation, megasporogenesis, megagametogenesis, and early embryony, and wherein the differences are relative to the the

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[development] developmental maturity of the nongametophytic ovule and ovary tissues, wherein the tissues are selected from the group consisting of nucellus, integument, pericarp, hypanthium, and pistil wall;

(b) [(d) obtaining two sets of diploid delineated sexual lines of said species, genus, or family such that said sets of delineated lines of sexual lines] selecting two plants that differ

(i) in their days to flowering or photoperiod required to induce flowering, and

(ii) such that initiation of embryo sac formation in one [set of diploid delineated sexual lines] plant occurs at about the same time as or before meiosis in the other [diploid delineated sexual lines] plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues; and

(c) [(e)] producing progeny plants that are apomictic by sexually crossing the [sexual reproduction of said] two [sets of diploid delineated sexual lines] plants [such that apomixis is expressed in said progeny].

Claim 34 (currently amended): A method for producing apomictic plants from sexual plants, wherein the method comprises [comprising]:

(a) obtaining two sexual diploid [lines,] plants of the same angiospermous species, genus, or family, [whose] wherein the female reproductive phenotypes of the plants differ such that under similar environmental conditions initiation of embryo sac formation in one [of said] sexual diploid [lines] plant occurs at about the same time as or before meiosis in the other [of said] sexual diploid [lines] plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues; and

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- (b) hybridizing the two sexual diploid plants [lines by plant breeding],
- (c) obtaining diploid progeny therefrom, and
- (d) selecting apomictic plants from among said diploid progeny.

Claim 35 (currently amended): A method for obtaining apomictic plants from sexual plants, wherein the method comprises [comprising]:

(a) obtaining two [sets of] diploid delineated sexual [lines] plants from an angiospermous plant species, genus, or family selected from families that exhibit apomixis in nature, wherein said [sets] plants differ in days to flowering or photoperiod required to induce flowering and differ such that initiation of embryo sac formation in one [set] plant occurs at about the same time as or before meiosis in the other [set] plant relative to the developmental maturity of the nongametophytic ovule and ovary tissue; and

- (b) hybridizing said [sets] plants,
- (c) recovering seed therefrom,
- (d) sowing said seed, and
- (e) selecting diploid hybrid [lines] plants that are apomictic [express apomixis].

Claim 36 (currently amended) A method for obtaining apomictic plants from sexual plants comprising:

(a) obtaining two [sets of] diploid delineated sexual [lines] plants from an angiospermous plant species or genus selected from the grass family, wherein said [sets] plants differ in days to flowering or photoperiod required to induce flowering and differ such that initiation of embryo

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sac formation in one [set] plant occurs at about the same time as or before meiosis in the other [set] plant relative to the developmental maturity of the nongametophytic ovule and ovary tissue; and

(b) hybridizing said [sets] plants,

(c) recovering seed therefrom,

(d) sowing said seed, and

(e) selecting diploid hybrid [lines] plants that are apomictic [express apomixis].

Claim 37 (currently amended) A method for obtaining apomictic plants from sexual plants comprising:

(a) obtaining two [sets of] diploid [delineated] sexual [lines] plants from an angiospermous plant species or genus selected from the Asteraceae family, wherein said [sets] plants differ in days to flowering or photoperiod required to induce flowering and differ such that initiation of embryo sac formation in one [set] plant occurs at about the same time as or before meiosis in the other [set] plant relative to the developmental maturity of the nongametophytic ovule and ovary tissue; and

(b) hybridizing said [sets] plants,

(c) recovering seed therefrom,

(d) sowing said seed, and

(e) selecting diploid hybrid [lines] plants that are apomictic [express apomixis].

IN THE ABSTRACT:

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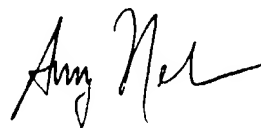
Methods are provided for producing apomictic plants from sexual plants divergent with respect to responses to different photoperiods and schedules of megaspore and gametophyte development. A preferred system is to identify divergent [lines] plants from within a species or closely related group of species, accentuate the divergence by breeding [where necessary], and produce artificial amphiploids that contain genomes from the apposing divergent [lines] plants. Apomixis results from the asynchronous expression of female developmental programs induced by [combining] crossing the reproductively divergent [lines] plants. The procedures for manipulating the expression of apomixis described herein permit the development of true-breeding hybrids of various cultivated crops.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, whose telephone number is (703) 308-5059. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson, can be reached at (703) 306-3218. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Customer Service at (703) 308-0198.

Anne R. Kubelik, Ph.D.  
October 16, 2003



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